

WHAT IS CLAIMED IS:

- 1 1. A chemiluminescence analyzer for determining the level of chemiluminescence of a
2 specimen comprising:
3 a light detection chamber for containing a specimen to be analyzed, said light
4 detection chamber including a chamber access device for allowing the positioning of
5 the specimen within said light detection chamber, said light detection chamber further
6 including a shutter device, wherein said shutter device and said chamber access
7 device are configured to each have an open position and a closed position;
8 a light detector, positioned behind said shutter device, for detecting light
9 within said light detection chamber when said shutter device is in said open position;
10 and
11 an interlock assembly, interfaced with said shutter device and said chamber
12 access device, for preventing said shutter device and said chamber access device from
13 simultaneously being in said open position.
- 1 2. The chemiluminescence analyzer of claim 1 wherein said light detector is a
2 photomultiplier tube which generates a chemiluminescence intensity signal indicative of the
3 level of chemiluminescence of the specimen positioned within said light detection chamber.
- 1 3. The chemiluminescence analyzer of claim 2 further comprising a signal processing
2 controller for processing said chemiluminescence intensity signal to generate output data
3 useable by an external device.
- 1 4. The chemiluminescence analyzer of claim 3 wherein said external device is a
2 personal computer for storing said output data, said personal computer including a data
3 presentation process for analyzing said output data and presenting said output data to the user
4 of said chemiluminescence analyzer in a graphical or tabular format.
- 1 5. The chemiluminescence analyzer of claim 3 wherein said chemiluminescence
2 intensity signal is a current-based signal, said output data is a digital signal indicative of the

3 level of chemiluminescence of the specimen positioned within said light detection chamber,
4 and said signal processing controller is a current-to-pulse frequency transformer circuit.

1 6. The chemiluminescence analyzer of claim 2 wherein said photomultiplier tube is a
2 head-on photomultiplier tube which senses the level of chemiluminescence through an end of
3 said photomultiplier tube.

1 7. The chemiluminescence analyzer of claim 2 wherein said photomultiplier tube is a
2 side-on photomultiplier tube which senses the level of chemiluminescence through a side of
3 said photomultiplier tube.

1 8. The chemiluminescence analyzer of claim 1 further comprising a temperature control
2 system for maintaining the ambient temperature within said light detection chamber at a
3 predefined level.

1 9. The chemiluminescence analyzer of claim 8 wherein said predefined level is a user
2 defined level and said temperature control system includes a thermostat for allowing the user
3 of said chemiluminescence analyzer to specify said user defined level.

1 10. The chemiluminescence analyzer of claim 9 wherein said temperature control system
2 includes an electric heating device, responsive to said thermostat, for maintaining the
3 ambient temperature within said light detection chamber at said predefined level.

1 11. The chemiluminescence analyzer of claim 1 wherein said chamber access device is a
2 specimen drawer into which the specimen is placed, said specimen drawer being configured
3 to slide into said light detection chamber, thus minimizing the intrusion of light into said light
4 detection chamber.

1 12. The chemiluminescence analyzer of claim 1 wherein said chamber access device is an
2 openable lid through which said specimen is positioned within said light detection chamber,
3 said openable lid being configured to minimize the intrusion of light into said light detection
4 chamber when said openable lid is in a closed position.

1 13. The chemiluminescence analyzer of claim 1 wherein said interlock assembly is a
2 mechanical interlock assembly which includes one or more mechanical linkages for
3 mechanically interconnecting said shutter device and said chamber access device to prevent
4 said shutter device and said chamber access device from simultaneously being in said open
5 position.

1 14. The chemiluminescence analyzer of claim 1 wherein said interlock assembly is an
2 electrical interlock assembly which includes one or more electrical actuation devices for
3 electrically interfacing said shutter device and said chamber access device to prevent said
4 shutter device and said chamber access device from simultaneously being in said open
5 position.

1 15. A chemiluminescence analyzer for determining the level of chemiluminescence of a
2 specimen comprising:

3 a light detection chamber for containing a specimen to be analyzed, said light
4 detection chamber including a chamber access device for allowing the positioning of
5 the specimen within said light detection chamber, said light detection chamber further
6 including a shutter device, wherein said shutter device and said chamber access
7 device are configured to each have an open position and a closed position; and

8 a photomultiplier tube, positioned behind said shutter device, for detecting
9 light within said light detection chamber when said shutter device is in said open
10 position, said photomultiplier tube being configured to generate a chemiluminescence
11 intensity signal indicative of the level of chemiluminescence of the specimen
12 positioned within said light detection chamber.

1 16. The chemiluminescence analyzer of claim 15 further comprising an interlock
2 assembly, interfaced with said shutter device and said chamber access device, for preventing
3 said shutter device and said chamber access device from simultaneously being in said open
4 position.

1 17. The chemiluminescence analyzer of claim 15 further comprising a signal processing
2 controller for processing said chemiluminescence intensity signal to generate output data
3 useable by an external device.

1 18. The chemiluminescence analyzer of claim 17 wherein said external device is a
2 personal computer for storing said output data, said personal computer including a data
3 presentation process for analyzing said output data and presenting said output data to the user
4 of said chemiluminescence analyzer in a graphical or tabular format.

1 19. The chemiluminescence analyzer of claim 15 wherein said photomultiplier tube is a
2 head-on photomultiplier tube which senses the level of chemiluminescence through an end of
3 said photomultiplier tube.

- 1 20. The chemiluminescence analyzer of claim 15 wherein said photomultiplier tube is a
- 2 side-on photomultiplier tube which senses the level of chemiluminescence through a side of
- 3 said photomultiplier tube.

1 21. A chemiluminescence analyzer for determining the level of chemiluminescence of a
2 specimen comprising:

3 a light detection chamber for containing a specimen to be analyzed, said light
4 detection chamber including a chamber access device for allowing the positioning of
5 the specimen within said light detection chamber, said light detection chamber further
6 including a shutter device, wherein said shutter device and said chamber access
7 device are configured to each have an open position and a closed position;

8 a light detector, positioned behind said shutter device, for detecting light
9 within said light detection chamber when said shutter device is in said open position,
10 said light detector being configured to generate a current-based chemiluminescence
11 intensity signal indicative of the level of chemiluminescence of the specimen
12 positioned within said light detection chamber;

13 a current-to-pulse frequency transformer circuit for processing said current-
14 based chemiluminescence intensity signal to generate a digital output data signal
15 indicative of the level of chemiluminescence of the specimen positioned within said
16 light detection chamber; and

17 a personal computer for storing the output data encoded within said digital
18 output data signal, said personal computer including a data presentation process for
19 analyzing said output data and presenting said output data to the user of said
20 chemiluminescence analyzer in a graphical or tabular format.

1 22. The chemiluminescence analyzer of claim 21 further comprising an interlock
2 assembly, interfaced with said shutter device and said chamber access device, for preventing
3 said shutter device and said chamber access device from simultaneously being in said open
4 position.

1 23. A chemiluminescence analyzer for determining the level of chemiluminescence of a
2 specimen comprising:

3 a light detection chamber for containing a specimen to be analyzed, said light
4 detection chamber including a chamber access device for allowing the positioning of
5 the specimen within said light detection chamber, said light detection chamber further
6 including a shutter device, wherein said shutter device and said chamber access
7 device are configured to each have an open position and a closed position;

8 a light detector, positioned behind said shutter device, for detecting light
9 within said light detection chamber when said shutter device is in said open position;
10 and

11 a temperature control system for maintaining the ambient temperature within
12 said light detection chamber at a predefined level.

1 24. The chemiluminescence analyzer of claim 23 wherein said predefined level is a user
2 defined level and said temperature control system includes a thermostat for allowing the user
3 of said chemiluminescence analyzer to specify said user defined level.

1 25. The chemiluminescence analyzer of claim 24 wherein said temperature control
2 system includes an electric heating device, responsive to said thermostat, for maintaining the
3 ambient temperature within said light detection chamber at said predefined level.

1 26. The chemiluminescence analyzer of claim 23 further comprising an interlock
2 assembly, interfaced with said shutter device and said chamber access device, for preventing
3 said shutter device and said chamber access device from simultaneously being in said open
4 position.

1 27. A method for determining the level of chemiluminescence of a specimen comprising:
2 positioning the specimen within a light detection chamber;
3 positioning a light detector behind a shutter incorporated into the light
4 detection chamber;
5 opening the shutter to allow the light detector to detect light within the light
6 detection chamber;
7 generating a chemiluminescence intensity signal indicative of the level of
8 chemiluminescence of the specimen positioned within the light detection chamber;
9 and
10 interfacing the shutter device and the chamber access device to prevent the
11 shutter device and the chamber access device from being simultaneously opened.

1 28. The method of claim 27 further comprising processing the chemiluminescence
2 intensity signal to generate output data useable by an external device.

1 29. The method of claim 28 further comprising analyzing the output data and presenting
2 the output data to the user of the chemiluminescence analyzer in a graphical or tabular
3 format.

1 30. The method of claim 27 further comprising maintaining the ambient temperature
2 within the light detection chamber at a predefined level.

1 31. The method of claim 30 wherein the predefined level is a user defined level, said
2 method further comprising allowing the user of the chemiluminescence analyzer to specify
3 the user defined level.

1 32. The method of claim 27 further comprising minimizing the intrusion of light into the
2 light detection chamber.

1 33. The method of claim 27 wherein said interfacing the shutter device and the chamber
2 access device includes mechanically interconnecting the shutter device and the chamber

3 access device with one or more mechanical linkages to prevent the shutter device and the
4 chamber access device from being simultaneously opened.

34. The method of claim 27 wherein said interfacing the shutter device and the chamber
access device includes electrically interfacing the shutter device and the chamber access
device with one or more solenoid devices to prevent the shutter device and the chamber
access device from being simultaneously opened.